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COSC 3399

August 22, 2021

Method and Algorithms for Searching Object in Video Stream with Compression in

Video Surveillance System

Nowadays, with the development of information technologies, video surveillance systems assist the whole world, for example in security, military industry, medicine, and energy saving. Video compression algorithms are constantly used for important tasks in cameras that are equipped with modules for intelligent detection of object movement in the video stream. Later on, these technologies should perform tracking of the object, predict the path of action and compare the image with the database with minimal memory costs. In the source of FaceFirst back in 2010, the ability to recognize objects or human faces was a subject of scientific research, now it has turned into real technology. Not only government agencies are interested in this technology (“Inside China’s Dystopian Dreams: A.I., Shame and Lots of Cameras”, “America Under Watch”), but also large commercial companies such as Google, Tesla, Cisco, and so on. ​​Analysis of the work of Professor Dr. Shah showed that in this direction, scientific work is carried out by many researchers, but despite this, today we need improved algorithms and ways to integrate quality as a parameter on making a decision.

In this research paper, general solutions for detecting objects in a video stream will be considered. The level of intelligence of video surveillance systems focuses only on moving objects. The new technology should compress video quality as much as possible with a still background image. Thus, it should speed up the process of matching with the database and reduce the need for a large amount of unused memory.

To achieve this goal, it will be necessary to solve the following tasks:

1. Get acquainted with technical literature, developments, and experiments on this topic.

2. Meet with Director Dr. Shah and discuss any questions that will accumulate during the work.

3. Develop collective goals and objectives for the topic: Compression of video streams and algorithms in video systems.

4. Determine the requirements for algorithms for detecting objects in a video stream.

5. Understand the methods of searching for objects in the video stream, for example, such as: "Motion Compensation Method", "Background Subtraction Method" and "Optical Flow Method".

6. Consider and exaggerate the level of intelligence of a video surveillance system in real-time.

7. Develop algorithms for searching for specified objects in real-time with minimal memory consumption.

8. Conduct experiments on the effectiveness of this work.

9. Make conclusions about the relevance of this video surveillance system, as well as about the quality of the object search process and its recognition in the video stream.

This research will be conducted at the University of Houston in Honors College under the thesis director Dr. Shah. The work will include special technical literature from M.D. Anderson Library. And also, Scientific articles and developments by Dr. Shah (“Understanding How Video Quality Affects Object Detection Algorithms”, “CAR-CNN: A Deep Residual Convolutional Neural Network for Compression Artifact Removal in Video Surveillance Systems”, “Assessing the Impact of Video Compression on Background Subtraction”) on video compression topics and algorithms in video systems will be used.

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